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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/608,776      | 06/30/2003  | Kei Yamamoto         | 204552028900        | 8129             |

7590 11/04/2005

Barry E. Bretschneider  
Morrison & Foerster LLP  
Suite 300  
1650 Tysons Boulevard  
McLean, VA 22102

EXAMINER

FLORES RUIZ, DELMA R

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2828

DATE MAILED: 11/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/608,776

**Applicant(s)**

YAMAMOTO ET AL.

**Examiner**

Delma R. Flores Ruiz

**Art Unit**

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-22 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3, and 5 – 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga (6,580,738) in view of Serreze (5,222,090) further in view of Hara et al (4,794,611).

***Regarding claim 1, Fukunaga*** discloses semiconductor laser comprising; a lower clad layer (see Fig. 7A, Character 122) a lower guide layer (reference call “waveguide”, see Fig. 7A, Character 123), an active region (see Fig. 7A, Characters 124 – 128) and upper guide layer (see Fig. 7A, Character 130) and an upper clad layer (see Fig. 7A, Character 137) are supported by GaAs substrate (see Fig. 7A character 121, Column 16, Lines 34) the active region having a quantum well (see Fig. 7A, Characters 126) structure in which one or more well layers (see Fig. 7A Character 126) and barrier layers (see Fig. 7A, Characters 124,125,127,128) are stacked, wherein said one or

more well layer and said barrier layer are formed of any one of InGaP, InGaAsP and GaAsP (Column 12, Lines 37 – 144).

Fukunaga discloses the claimed invention except for semiconductor laser device having an oscillation wavelength of larger than 760nm and smaller than 800nm. However, it is well know in the art for the high power semiconductor laser device to have an oscillation wavelength larger than 760nm and smaller than 800nm as discloses by Serreze in Column 1, Lines 6 – 10 and 63 – 68. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine semiconductor laser device of Serreze with the semiconductor laser device of Fukunaga because it would provide a high power semiconductor laser device with low threshold current, Column 1, Lines 6 -10.

Fukunaga discloses the claimed invention except for upper and/or lower guide layer is formed of  $\text{Al}_z \text{Ga}_{1-z} \text{As}$  ( $0.20 < z < 1$ ). However, it is well know in the art use the semiconductor layers made of  $\text{Al}_{0.4} \text{Ga}_{0.6} \text{As}$ , as disclosed by Hara in Column 1, Lines 23 – 25, and Column 2, Lines 41 – 52. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the semiconductor layers of Hara with the laser of Fukunaga, because it will provide optical confinement, Column 2, Lines 51 – 52.

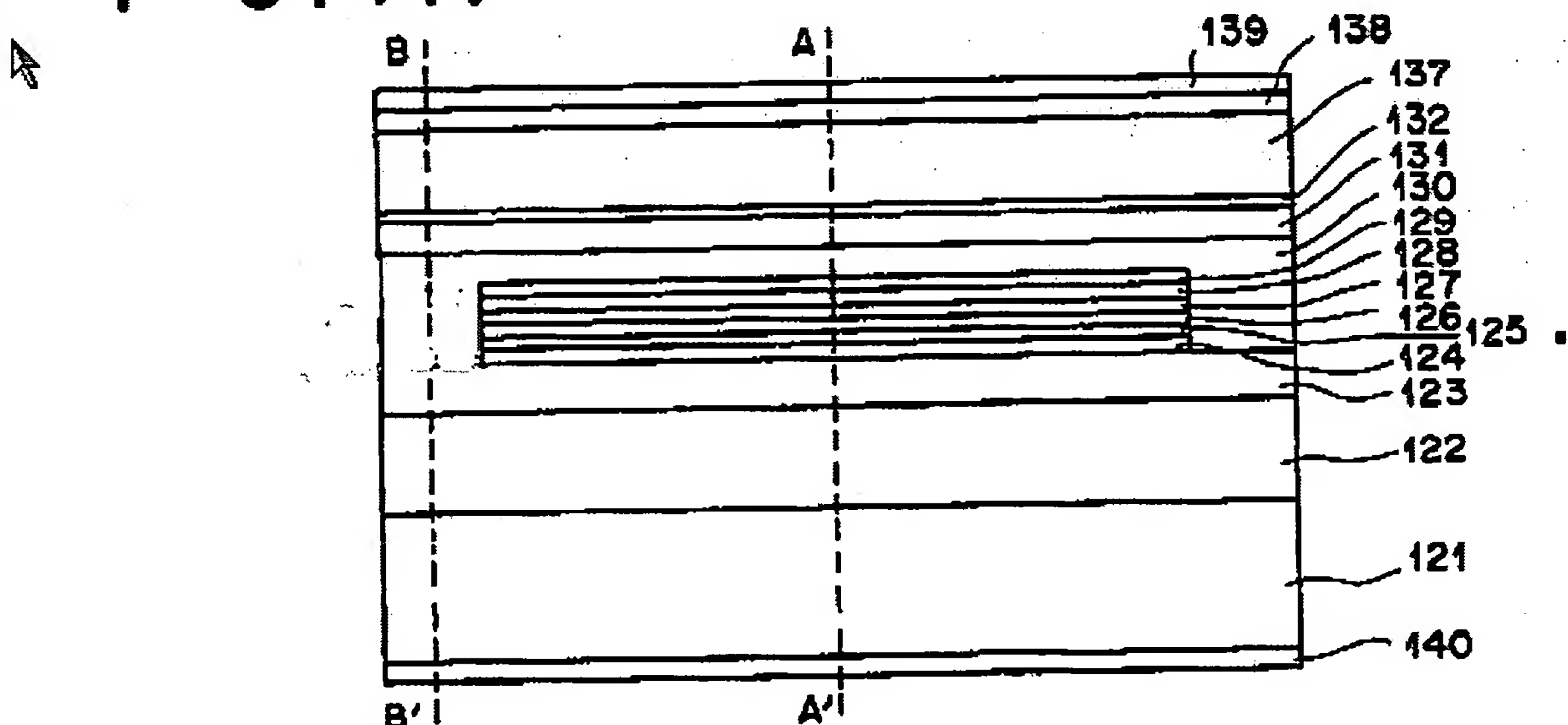
**Regarding claim 2, Fukunaga** discloses the claimed invention except for and a value of  $z$  representing a mole fraction of Al in the group-III elements of said upper

and/or guide layer is larger than 0.25. However, it is well known in the art to use the semiconductor layers made of  $\text{Al}_{0.4}\text{Ga}_{0.6}\text{As}$ , as disclosed by Hara in Column 1, Lines 23 – 25, and Column 2, Lines 41 – 52. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the semiconductor layers of Hara with the laser of Fukunaga, because it will provide optical confinement, Column 2, Lines 51 – 52.

**Regarding claim 3**, Fukunaga discloses a upper and lower cladding (see Fig. 7A, Characters 137 and 122) contain Al, and a value of  $z$ , wherein a value of  $z$  represent a mole fraction of Al in the group-III elements of said upper and/or lower guide layer, is smaller than a value of an Al mole fraction of said upper and lower clad layer (Column 16, Lines 35, Column 17, Line 30).

Disclose Figure 7A by Fukunaga ('738).

**F I G . 7 A**



**Regarding claim 5**, Fukunaga discloses claimed invention except for a value of  $z$ , where a value of  $z$  represents a mole fraction of Al in the group-III elements of upper and/or lower guide layer, of at least a portion in contact with a barrier layer of said upper and/or guide layer is smaller than 0.4. However, it is well known in the art that semiconductor layers made of  $\text{Al}_{0.4}\text{Ga}_{0.6}\text{As}$ , as disclosed by Hara in Column 1, Lines 23 – 25, and Column 2, Lines 41 – 52. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the semiconductor layers of Hara with the laser of Fukunaga, because it will provide optical confinement, Column 2, Lines 51 – 52.

**Regarding claim 6**, Fukunaga discloses a one or more well layers have a compressive strain (see Fig. 7A Character 126, Column 10, Lines 40-41).

**Regarding claim 7**, Fukunaga discloses barrier layer have a tensile strain (see Fig. 7A Character 125, Column 16, Lines 39 – 40).

**Regarding claim 8**, Fukunaga discloses a semiconductor laser is a light emitting device (see Fig. 7).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 – 22 have been considered but are moot in view of the new ground(s) of rejection.

### ***Allowable Subject Matter***

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9 – 22 are allowed.

The following is an examiner's statement of reasons for allowance: Claim 9 recites a semiconductor laser structure including the specific structure limitation of barrier layer are formed of an  $\text{In}_{1-x}\text{Ga}_x\text{As}_{1-y}\text{P}_y$  having a band gap energy larger than that of said well layers, and there hold relationship that  $0 < x < 1$ ;  $0.02 < y < 0.75$  and  $|(a_2 - a_1) / a_1| * 100 \leq 0.65$ , where  $a_1$  is lattice constant of said one or more well layers, and  $a_2$  is lattice constant of said barrier layers, which is neither anticipated or disclosed nor suggested in any piece of available prior art, which is neither anticipated nor obvious over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Flores Ruiz whose telephone number is (571) 272-1940. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) -272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should



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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Delma R. Flores Ruiz  
Examiner  
Art Unit 2828

DRFR/MH  
October 24, 2005

  
Min Sun Harvey  
Supervisor Patent Examiner  
Art Unit 2828